higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1150(E)(A2)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

METAL WORKERS' THEORY N1

(11022061)

2 April 2013 (X-Paper)
09:00–12:00

REQUIREMENTS: Drawing instruments

Calculators may be used.

This question paper consists of 6 pages and a 1-page addendum.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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NATIONAL CERTIFICATE
METAL WORKERS' THEORY N1
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Keep ALL the subsections of questions together.
5. Show ALL the calculation steps where calculations are done.
6. QUESTION 3 must be answered on ADDENDUM A and then handed in with the ANSWER BOOK.
7. Use $\pi = 3,142$.
8. Write neatly and legibly.

QUESTION 1

Indicate whether the following is regarded as either an *unsafe act* or *unsafe condition*.

1.1 Poor lighting

1.2 Defective tools and equipment

1.3 Failure to use protective equipment

1.4 Unguarded machinery

1.5 Working without permission

(5 × 1) **[5]**

QUESTION 2

2.1 Name THREE types of punches used in metalwork. (3)

2.2 Fill in the missing words in relation to the hammer. Write only the words/term next to the question number (2.2.1–2.2.2) in the ANSWER BOOK.

The head of the hammer is made from (2.2.1) ... steel. The hammerhead is fitted to a wooden shaft, which is normally made from (2.2.2) .... (2)

2.3 Describe the angle of presentation in relation to chisels. (2)

2.4 State the function of each of the following marking-off tools:

2.4.1 Scriber

2.4.2 Outside callipers

2.4.3 Try square

2.4.4 Trammels

2.4.5 Bevel gauge (5 × 1) (5)

2.5 Calculate the hypotenuse side of a rectangular 10 mm steel plate, with 120 mm vertical side and 185 mm horizontal side. (3)
[15]

Hint: $V^2 = R^2 - H$

QUESTION 3

Use FIGURE 1, ADDENDUM A (attached) to answer this question. Drawing instruments must be used.

FIGURE 1 shows a T-piece between two unequal diameter steel pipes.

3.1 Draw the line of penetration between the two pipes. (2)

3.2 Calculate the circumference of the 36 mm diameter pipe. (2)

3.3 Develop the shape of the hole in the main pipe. (2)

3.4 Develop the pattern of the branch pipe. (4)
[10]

HINT: C = 3,142 x D
Hand in ADDENDUM A on completion.

QUESTION 4

4.1 Explain the following metal properties:

4.1.1 Elasticity

4.1.2 Ductility

4.1.3 Malleability (3 × 1) (3)

4.2 Describe the nature of mild steel with reference to the following:

4.2.1 Carbon content (1)

4.2.2 Metal properties (2)

4.2.3 Uses (2)

4.3 State the meaning of the following abbreviations:

4.3.1 DRG

4.3.2 RPM (2 × 1) (2)

4.4 Calculate the back mark of a 50 mm x 50 mm x 6 mm angle iron. (2)
[12]

QUESTION 5

List FIVE safety precautions which must be considered before and during the use of the following machinery:

5.1 Pedestal drilling machine (5)

5.2 Horizontal bending rolls (5)

[10]

QUESTION 6

6.1 With the aid of a simple sketch, explain the following terms in relation to riveted joints:

6.1.1 Single-riveted lap joint (2)

6.1.2 Snap-head rivet (1)

6.1.3 Landing (1)

6.1.4 Pitch (1)

6.2 Calculate the length of the rivet required to rivet two 18 mm thick plates together. Use 25 mm diameter rivets. (3)

6.3 Describe the function of the countersunk bolts. (2)

[10]

QUESTION 7

7.1 Arrange the following list of gas apparatus in order of sequence, as applicable to the oxy-acetylene gas-welding assembly process. Write only the correct order in your ANSWER BOOK:

	Incorrect order	Correct order
7.1.1	Flash-back arresters	7.1.1
7.1.2	Welding torch	7.1.2
7.1.3	Pressure regulators	7.1.3
7.1.4	Gas bottles	7.1.4
7.1.5	Welding hose	7.1.5

(5)

7.2 Give TWO functions of the pressure regulators. (2)

7.3 Draw a labelled sketch of a leftward-welding technique. (2)

7.4 State FOUR causes of backfire during the gas cutting process. (4)

7.5 Explain how to extinguish the LP-oxygen gas welding flame. (2)

[15]

QUESTION 8

8.1 List FIVE types of protective clothing that should be worn during arc welding and give reasons. (5)

8.2 Give FOUR advantages in using an AC welding machine. (4)

8.3 Explain the following welding terms:

8.3.1 Tungsten inert gas welding (2)

8.3.2 Earthing (2)

8.4 State the function of the following welding equipment:

8.4.1 Wire brush

8.4.2 Chipping hammer (2 × 1) (2)
[15]

QUESTION 9

9.1 The internal diameter of a mild steel plate with a 10 mm thickness is 864 mm.

9.1.1 Calculate the length of material required to form the cylinder. (4)

9.1.2 Calculate the length of the external stiffening ring when a 12 mm round bar is used. (4)
[8]

TOTAL: 100

ADDENDUM A

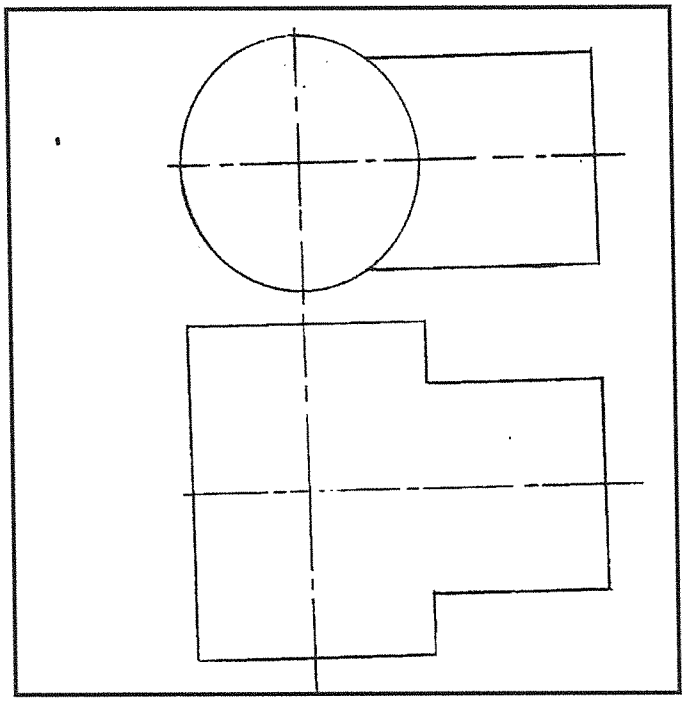

FIGURE 1